

REMARKS

Claims 1-9 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Thoman, Jr. (the '379 patent) in view of Moriarty et al. (the '244 patent).

Claim 1 has been amended to recite: (1) the step of fabricating a fluid seal, which is thereby distinguished from the seal of the '379 patent, a seal that prevents extrusion of material in the solid state, (2) the expansion step plastically deforms the seal; and (3) the inserting step occurs after the seal is expanded.

The Office action acknowledges that the '379 patent fails to disclose the step of placing the second inner surface of the seal over the outer surface of a mandrel having a larger diameter than the inside diameter; and expanding the seal on the mandrel such that a gap is formed at the scarf cut. The Office action says that the '244 patent teaches the step of placing the inner surface over the outer surface of a cylindrical mandrel having a diameter larger than the inside diameter and expanding the seal on the mandrel such that a gap is formed at the scarf cut. The Office action says this disclosure occurs at column 28, lines 53-63 of the '244 patent.

Claim 1 has been amended to specify that the seal is a fluid seal of plastic material, expanding the seal on the mandrel plastically deforms the seal at the scarf cut, and the seal is inserted in the groove after the seal has expanded.

The '379 patent discloses anti-extrusion or back-up rings 70 seated in grooves on axial opposite sides of a seal 60. Rings 90 do not produce a fluidic seal, they merely prevent the extrusion of seal 60. The purpose of the invention of the '379 patent is to prevent extrusion of seal material 60 past the scarf cuts formed in the anti-extrusion, back-up rings 70. The '379 patent says that the primary function of the back-up rings 70 is to prevent the softer elastomeric seal element 60 from being damaged as a result of its being forced or extruded into the clearance 66. (See column 1, lines 54-58). Therefore, Claim 1 is distinguished over the disclosure of the '379 patent, which does not disclose or suggest placing a fluid seal in a groove.

The '244 patent describes a technique for assembling the seals of Figures 51 and 52 by passing a mandrel through the bore of seal 132 for axially aligning the seal and expanding the seal device for the purpose of pre-tensioning. There is no disclosure in the '244 patent that the mandrel plastically deforms the seal 132. The '244 patent says the seal 132 is made of metal such as cast iron or bronze or a harder material such as mild steel (see column 15, lines 41-59).

The '244 patent discloses that the seal 132, body portion 512 and cap portion 513, shown in Figures 9 and 10, are inserted in the cavity and assembled as shown in Figures 50 and 51. Then a stabilizer is inserted into the cavity. Before the stabilizer sets, a mandrel may be passed through the bore of the seal. (See column 28, lines 58-63). The '244 patent teaches away from inserting the seal in the groove after the seal has been expanded, as Claim 1 of the present application defines the subject invention. Furthermore, seal 132 contains no scarf cuts, but only an axially directed slot 150, as shown in Figures 9 and 10.

There is no teaching or suggestion in the '379 patent that the back-up rings 70 should be expanded at any time, either before or after insertion into the groove.

Neither the method defined by claim 1 nor any of the dependent claims of this application are disclosed or suggested by the combination of method steps resulting by combining the teachings of the '244 and '379 patents.

There is no need to expand the seal device 132 of the '244 patent to open a space at a scarf cut because the seal device 132 already has an opening at the axial cut 143. Neither reference suggests expanding a seal of any kind before placing the seal in its groove. No combination of steps resulting from the disclosure of the cited prior art references would disclose or suggest the method defined by claim 1.

Claims 1, as amended, and its dependent claims 3-9 define an invention that is patentably distinguishable over the cited prior art references. Those claims appear now in condition for allowance. Favorable action is respectfully solicited.

Respectfully submitted,

A handwritten signature in cursive script, reading "F G McKenzie", written over a horizontal line.

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